KENYA MEDICAL TRAINING COLLEGE

(PORTREITZ CAMPUS)

DEPARTMENT OF PHYSIOTHERAPY

Exercise Physiology Exam

September 2012 class

Duration: 2hrs

Date:

College No……

Instructions:

Attempt all questions in this paper

Present your work neatly on the foolscaps provided

Write your college number on every sheet you use

Examination rules and regulations apply

Section A: Multiple-Choice Questions (40mks) (Circle the most correct answer)

Q 1. Endurance training increases the muscles capacity to:

a) Contract faster
b) Breakdown phosphocreatine
c) Burn fat and carbohydrate
d) Generate energy anaerobically

Q 2. The principle contractile proteins found in a skeletal muscle is:

a) Actin and troponin
b) Actin and myosin
c) Troponin and tropomyosin
d) Actin and tropomyosin

Q 3.The sarcoplasmic reticulum in muscle cell acts as a:

a) Store of sodium
b) Store of lipids
c) Store of calcium ions
d) Store of calcium buffer of hydrogen ions

Q 4. An action potential arriving at the motor endplate causes release of :

a) Acetylcholine which traverses the neuromuscular junction
b) Sodium ions which bind to sodium receptors on the muscle membrane
c) Calcium ions which initiate an action potential along the muscle fibre
d) Noradrenaline which increases musle metabolic activity

Q 5. The trigger to initiate the contractile process in skeletal muscle is:

a) Potassium binding to myosin
b) Calcium binding to tropomyosin
c) Calcium binding to troponin
d) ATP binding to the myosin cross bridges

Q 6. After calcium ions have been released from the sarcoplasmic reticulum they:

a) Initiate an action potential
b) Cause sodium channels to open in the sarcolemma membrane
c) Bind to troponin
d) Bind to actin

Q 7. Which of the following statements is correct about fast twitch fibres:

a) They have a relatively large number of mitochondria and low ATPase activity
b) They have a relatively small number of mitochondria and low ATPase activity
c) They have a relatively small number of mitochondria and high ATPase activity
d) They have a relatively large number of mitochondria and high ATPase activity

Q 8. Which of the following statements represents the true characteristics of type I muscle fibres:

a) White, glycolytic, slow, contracting
b) White, oxidative, slow contracting
c) Red, glycolytic, slow contracting
d) Red, oxidative, slow contracting

Q 9. The energy for all forms of muscle contraction is provided by:

a) ATP
b) ADP
c) Phosphocreatine
d) Oxidative phosphorylation

Q 10. The initial energy source for very high force contractions lasting 1-2 seconds is from:

a) Glycolysis
b) Creatine phosphorylation
c) Phosphocreatine stores
d) ATP stores

Q11. Anaerobic metabolism refers to the generation of of ATP:

a) Without the involvement of ADP
b) Without the use of glycogen
c) Without the use of oxygen
d) In the absence of available oxygen

Q 12. The most rapid method to resynthesize ATP during exercise is through

a) Glycolysis
b) Phosphocreatine breakdown
c) Krebs cycle
d) Glycogenolysis

Q 13. In general the higher the intensity of exercise, the greater the proportional contribution of :

a) Aerobic energy production
b) Anaerobic energy production
c) Fat oxidation
d) Krebs cycle to the production of ATP

Q 14. Glycolysis is the name given to the pathway involving the conversion of:

a) Glycogen to glucose -6- phosphate
b) Glycogen to glucose or fructose
c) Glycogen or glucose to pyruvate or lactate
d) Glucose or fatty acids to pyruvate or Acetyl Co A

Q 15. If the mean rate of oxygen consumption of a male athlete during a training session is 2l/min, then his rate of energy expenditure is approximately:

a) 400 kj/min
b) 200 kj/min
c) 80 kj/min
d) 40 kj/min

Q 16. How much energy expressed in K/CAL is the work in question 15 equal to:

a) 10 kcal
b) 20 kcal
c) 40 kcal
d) 0.1kcal

Q 17. Muscle lactate production increases when:

a) pyruvate cannot be formed from glucose breakdown
b) The PH of muscle falls
c) Muscle glycogen becomes depleted
d) Glycolysis is activated at the onset of exercise

Q 18. Regarding carbohydrates, it is correct that low intake in the diet:

a) Does not influence exercise performance in events lasting less than ten minutes
b) May impair high intensity exercise performance
c) Results in greater reliance of muscle glycogen during exercise
d) Is associated with metabolic alkalosis

Q 19. Glucose enters muscle cell mostly by:

a) Simple diffusion
b) Facilitated diffusion using specific glucose transporter
c) Co-transport with sodium
d) Co-transport with amino acids

Q 20. Which of the following exercises is predominantly anaerobic

a) Jogging
b) Swimming
c) Stair climbing
d) Weight lifting

Q 21. In which of the following cellular structures does aerobic resynthesis of ATP occur:

a) Only in type I muscle fibres
b) In the sarcoplasmic reticulum
c) In the cytosol
d) In the mitochondria

Q 22. During exercise, adrenaline secretion from the adrenal glands is stimulated by:

a) Negative feedback
b) Increased plasma glucose
c) Increased sympathetic nerve activity
d) Increased plasma fatty acid

Q 23. Which one of the following statements is not true?

a) Elite endurance runners have a high proportion of type I fibres in their leg muscles
b) Insulin promotes glucose uptake by all tissues in the body
c) Liver glycogen is important in maintenance of the blood glucose concentration
d) Glucagon has generally antagonistic actions to those of insulin

Q 24. Resting oxygen uptake for a 70 kg person is approximately

a) 1.01min
b) 2.5 ml/min
c) 0.25 l/min
d) 45 ml/min

Q 25. The average intensity of exercise during professional soccer play is about?

a) 25 % vo2 max
b) 50 % vo2 max
c) 75 % vo2 max
d) 90 % vo2 max

Q 26. It is true that with increasing number of sprints the:

a) Anaerobic contribution progressively increases
b) Blood glucose concentration falls below 3 mmol/l
c) Relative contribution of aerobic metabolism increases
d) Maximum power generated increases

Q 27. It is true that training for strength and power has little effect on:

a) Muscle mass
b) Muscle strength
c) Anaerobic capacity
d) Aerobic capacity

Q 28. The following are cardiovascular adaptations to endurance training. Which one is not?

a) Increased maximal cardiac output
b) Lower resting heart rate
c) Increased blood volume
d) Atrophy of cardiac muscle

Q 29. It is true that in isometric muscle contractions:

a) ATP is utilized in large amounts
b) Muscle length decreases during contraction
c) Shortening of the contractile component does not occur
d) There is stretching of the elastic component

Q 30. During exercise skeletal muscle blood flow increases 15 to 25 times the resting value is mainly due to:

a) Increased arterial blood pressure
b) Increased secretion of catecholamines
c) Local metabolic factors
d) Stimulation of sympathetic vasodilator nerves

Q 31. The maximum power that can be developed by a skeletal muscle :

a) Is independent of the initial length of the muscle
b) Occurs with an isometric contraction
c) Occurs when the muscle is moving a load at about 1/3 of its maximum rate of shortening
d) Occurs when the muscle is shortening at its maximum rate

Q 32. Benefits of exercise for pregnant women include all of the following except?

a) Longer labour
b) Less weight gain
c) Less discomfort
d) None of the above

Q 33. The American college of sports medicine recommends an exercise prescription for Pregnant women to be :

a) 30 to 40 minutes for moderate intensity aerobic exercise most days of the week
b) 30 to 40 minutes of light intensity aerobic exercise most days of the week
c) 30 minutes of moderate intensity aerobic exercise three days a week
d) 20 to 30 minutes of moderate intensity aerobic exercise

Q 34. According to the sliding filament mechanism of muscle contraction, during Contraction

a) The thick filaments stay the same size but thin filaments shorten
b) The sarcomeres shorten
c) The thin filaments stay the same size but the thick filaments shorten
d) Both thick and thin filaments shorten

Q 35. The FITT principle can help with the design of a fitness program. The acronym FITT stands for:

a) Full range of motion, intensity, time, type
b) Full range of motion, intensity, time, rest
c) Frequency, intensity, time , rest
d) Frequency, intensity, time, type

Q 36. Which of the following components of fitness is defined as the bodys ability to sustain prolonged exercise

a) Muscle endurance
b) Body composition
c) Cardiorespiratory endurance
d) Muscle strength

Q 36. It is correct that during the process of excitation-contraction coupling

a) Acetyl choline binds to muscarinic receptors
b) The transverse tubules release calcium ions in response to deporalization of the cell through an unknown mechanism
c) Cross bridges form when ATP binds to myosin
d) Release of calcium ions causes the binding sites on the thin filaments to be uncovered

Q 37. The amount of tension generated by a skeletal muscle;

a) Is greatest when the muscle is between 100 to 120 % of its optimal resting length
b) Is increased by recruiting more motor units
c) Is increased by summation
d) All the above are correct

Q 38. Which of the following changes does not occur during exercise

a) Increased blood flow in corresponding skeletal muscles
b) Extraction of oxygen from the blood
c) Increase in ventilation
d) Increase in diastolic blood pressure

Q 39. The skeletal muscle remains eccentrically refractory only in:

a) Latent phase
b) Contractile phase
c) End of contraction phase
d) Relaxation phase

Q 40. The shortening of the contractile elements in skeletal muscle is brought about by?

a) Sliding of the thick filaments over the thin filaments
b) Sliding of the thin filaments over the thick filaments
c) Sliding of both filaments over each other
d) Sliding of two adjacent “z” lines

Section B: Short answer questions

Q 41. Abdalla Hussein 25 yrs.is an athlete based on the coastal town of Mombasa. He is Training for an international marathon competition hence travels a month earlier to the High attitude areas of Kapkatet (Riftvalley) for further training.

Write short notes about what is likely to happen in his body in an effort to "acclimatize" to this new environment (6mks)

Q 42. Highlight four major changes that occur in a skeletal muscle tissue as a result of aerobic conditioning (4mks)

Section C: Essay Questions